RESULTS FROM *WORK SMART* STANDARDS

INTRODUCTION

The reports from the laboratories and sites where Work Smart Standards are complete or nearing completion consistently emphasize that Work Smart provides a solid foundation for a truly effective Integrated Safety Management System. As stated by Dick Nolan, DOE Area Office Manager for Lawrence Berkeley National Laboratory:

> "*Work Smart is the foundation of the whole safety management system. It provides a common set of standards that are work-based and contractually established - that the community, DOE and the contractors, can agree on and mutually understand why these standards are necessary. Other important benefits of Work Smart come from how DOE and contractors participate in the Work Smart process. The interactions between DOE and the contractor in developing mutual agreements on the work, the hazards and the standards result in building the trust, teaming and communication that are essential to change behaviors and make tangible alterations to the way we manage safety*."

Application of the *Work Smart* approach at DOE sites is strengthening the DOE Safety Culture. Tangible benefits of hazards reduction, cost reduction, improved opportunities for international science and technical leadership and elimination of bureaucratically driven paper work are being achieved. Through *Work Smart* a new appreciation is being gained not only for the diversity of DOE's work and working cultures, but also for the enormous diversity of the working population. At cleanup sites and weapons production sites, the workers are researchers responsible for hands-on operation of complex research apparatus and facilities. Regardless of the work force composition *Work Smart* teams that include workers, engineers, planners, safety specialists and scientists working collaboratively achieve a new depth of understanding of the work, the hazards, the work environment and the controls needed to perform the work safely. For example:

- At Los Alamos the pipe fitters, physicists and health physics technicians have gained a new appreciation of the need to plan and carry out work as co-equal team members.

- At Oak Ridge carpenters, electricians and mechanics are now working with planners, engineers, scientists, financial specialists and others to jointly plan decontamination and decommissioning work.

- At Rocky Flats Building 771 the workers say that by applying *Work Smart* they understand the safety basis for their work better than ever before.

Furthermore, the increasing number of *Work Smart* applications is stimulating a new era of organizational earning about how to improve safety while improving productivity at DOE sites and across the DOE complex.

C O N T E N T S

Richland

- The Reduction Oxidation Plant (REDOX): ES&H standards for long term surveillance and maintenance of the Reduction-Oxidation Facility
- The PUREX Plant: ES&H standards for long term surveillance and maintenance

Rocky Flats

- Rocky Flats Environmental Technology Site: ES&H authorization basis and standards for Buildings 440 and 771.

Ohio Field Office

- Mound: Decontamination and Decommissioning of the CFX facility.

Savannah River

- Westinghouse Savannah River Company:
    - ➪ Commercial design and documentation standards for a groundwater remediation project; and,
    - ➪ Environmental Restoration

OAKLAND

The Lawrence Berkeley National Laboratory applied *Work Smart* to all activities. The resulting set of *Work Smart* Standards tailored to the work included voluntary standards not previously identified as necessary to achieve adequate protection. Half of the adopted standards are voluntary standards. This demonstrates that the Laboratory's ES&H performance standards go beyond minimum compliance. In the process, an unprecedented level of understanding of the work activities and associated hazards was achieved. This understanding led to a computerized system to provide a real-time picture of the work, the associated hazards and the standards applied to that work. LBNL is developing their ISMS plan as a follow-on to the development of their Work Smart Standards set. An ISMS plan and description are in the final stages of development by LBNL and will be presented to the DOE Berkeley Site Office for review and approval. The results of the Work Smart process provided a sound foundation for ISM based on mutual support and agreement by DOE and the University of California. LBNL is currently revising its assessment and feedback programs based on the Work Smart standards set and the ISMS principles with a major emphasis on operational awareness.

- Adoption of industry standards demonstrates to the community and regulators that the Department and the Laboratory comply with accepted industry practices and requirements, and are not hiding behind sovereign immunity.

- Adoption of industry standards lays the foundation for increased Department and Laboratory participation and technical contribution to industry standards boards. This is especially important in forefront technologies where setting the standards can impart clear technical advantage in international competition.

- Perhaps the most important and lasting benefit of the *Work Smart* Standards project may prove to be the impetus that it has provided for follow-on Department and Laboratory partnerships to improve and streamline the management of ES&H. Current partnership initiatives underway include:

  ➢ Alignment of ES&H processes and management with the seven principles of Integrated Safety Management.

- ➢ Improving the contract Performance Measures to be more comprehensive.

- ➢ Bridging and coordinating ES&H Performance Review processes and activities to eliminate redundancies and be less operationally disruptive.

The Lawrence Livermore National Laboratory applied *Work Smart* to radioactive waste operations at the laboratory. Based on this successful application, *Work Smart* is being applied site-wide. The definition of the work and its hazards is nearing completion. Workers, facility staff, ES&H support staff and representatives from DOE/OAK from 88 facilities have established teams to define the work and hazards. Seventeen additional teams are defining the work and hazards for general institutional activities. The Standards Identification Team composed of LLNL and DOE/OAK staff has been selected. The team is beginning to select the standards based on the defined work and hazards. The Convened Group is selecting the team that will confirm the set of standards. The Work Smart process is to be completed in early December 1997 and its completion is a major step toward demonstrating an ISM program.

The DOE/OAK and LLNL agree that there are several important benefits from applying the WS process. The process reinforces the traditional focus on the work and working safely. The process tailors the set of safety requirements to the work at LLNL and away from one-size-fits-all compliance. The process has improved partnering between LLNL and DOE/OAK by fostering frank open discussion at the level of the work and at several levels of management. It is important for the Laboratory to become more cost competitive with industry. LLNL will have a clear link between safety in the workplace and the requirements of the contract with the DOE. Taken together these create an improved safety culture that is seen by the workers and line management as adding value to the workplace. The WS process prepares the Laboratory for external regulation and moves it toward commercial practices. To the extent that consensus standards and regulations are sufficient to establish the appropriate level of safety, the Laboratory will avoid the cost of implementing the revised DOE ES&H Orders. The WS process helps the Plutonium Facility meet the expectations of the Defense Nuclear Facility Safety Board.

OAK RIDGE

Eighteen applications of Work Smart Standards have been completed and approved or are currently in process. For some of those that have been completed, such as at Oak Ridge National Laboratory, work is also under way to implement Integrated Safety Management. The laboratory reports that the Work Smart Applications were the foundation for success in ISMS. The buy-in and participation of researchers, ES&H professionals and managers of both DOE and contractors opened the door for successful ISM implementation. The lab also reports that the Work Smart application has provided a reliable basis for discriminating between initiatives that might improve safety management versus those that would offer little or no improvement.

The Oak Ridge National Laboratory organization in Tennessee applied *Work Smart* to update its Standards/Requirements Identification Document (S/RID) for all activities at the Laboratory. The Laboratory anticipates 10 - 15% savings in their ES&H budget from this application. Additional savings of $2 - $3 million is expected through implementation of the *Work Smart* Standards by the research and support organizations. Approximately $1 million will be saved in training costs associated with implementation.

- The Environmental Management-Enrichment Facilities (K-25) site applied *Work Smart* to surveillance and maintenance activities and improved efficiency by modifying surveillance and maintenance schedules to match the nature of the work and hazards.

- The Formerly Utilized Sites/Remedial Action Program applied *Work Smart* to all activities and saved $2 million in FY 1997, with projected savings of $19 million in future years. *Work Smart* is being used to support performance-based and fixed price contracting.

- The Water Treatment Plant operated by Johnson Controls, Inc., applied *Work Smart* for all activities and achieved a cost avoidance of $134,000 through identification and implementation of improved Training Requirements.

The Thomas Jefferson National Accelerator Facility The Thomas Jefferson National Accelerator Facility (Jefferson Lab) in Newport News, Virginia applied

the Work Smart process to all activities at the Laboratory. The process was completed for the hazards-based ES&H activities in August 1996 and the same type process was subsequently applied to other ES&H administrative requirements later in calendar year 1996. The results were: of approximately 1500 ES&H requirements, 40% were applicable by law or regulation and another 50% were either not applicable to work activities at the Laboratory or provided no benefit in terms of increased ES&H protection. The remaining 10% were retained in the contract because they were necessary to achieve the desired level of ES&H protection or provided some other benefit. The results are: a much better understanding among Lab and Site Office employees of the underlying laws and regulations and the additional contractual requirements; better demonstration to the community and regulators that the Lab is complying with the applicable laws, regulations and industry standards; and significantly reduced perception that scarce resources are directed to requirements that yield no real improvement in ES&H protection. The concept of focusing on the work process and hazard reduction also provided an excellent foundation to build the Lab's Integrated Safety Management Plan, which has recently been submitted to the Department. The Work Smart concept has strengthened ES&H training and resulted in better utilization of ES&H personnel and other resources. There is no doubt that this is one of the primary reasons that the Laboratory has been able to achieve full operating status and satisfy other important Department Initiatives in spite of severely constrained funding.

ALBUQUERQUE

The Los Alamos National Laboratory has completed a site wide application of *Work Smart.* The Laboratory, in close partnership with DOE, has fully met DOE Manual 450.3-1, The Department of Energy Closure Process for Necessary and Sufficient Sets of Standards, in identifying, confirming, and approving a site-wide (institutional) set of ES&H Work Smart Standards. These standards are tailored to the Laboratory's work and associated ES&H issues; are aimed at adequately protecting the workers, the public, the environment, and facilities; and include federal, state, and local laws and regulations and, where needed to achieve adequate protection (not just legal compliance), national consensus standards representing the highest operating standards used by industry. These standards were successfully confirmed on July 11, 1997, by an independent "blue-ribbon" confirmation team comprising senior industry executives, the National Safety

Council's Director of Occupational Safety & Health, and senior representatives from the DOE, LBNL, JCI, PTLA, and the Laboratory.

On July 21, 1997, the confirmed standards and supporting documentation were placed in DOE's Los Alamos Community Reading Room and the Los Alamos Outreach Centers in Taos and Espanola, and external stakeholders were notified by letter and public news release asking for their review and comment. With the absence of public concern, the entire set of ES&H Work Smart Standards was approved by the Laboratory Director and the DOE/LAAO Manager on September 22 and by the DOE/AL Manager on September 23, 1997. Contract modification is now underway so that these standards will serve as contractual ES&H requirements for Los Alamos, replacing ~30 DOE ES&H Directives in the current contract between DOE and the University of California. Note that these standards will be subject to ongoing review and update to ensure their sufficiency for performing work safely, consistent with the Laboratory's Integrated Safety Management Plan.

- *Work Smart* produced a teaming effort among Albuquerque, the Laboratory and the University of California unprecedented in recent years. In addition to improved teamwork, DOE and the Lab now share a more common understanding of the work, the hazards and agreement on the standards than has existed in a number of years.

- The involvement of the people who do the work and who are exposed to the hazards in establishing safety expectations has been a major factor in improving the Los Alamos safety culture.

NEVADA

At the Nevada Test Site the Work Smart application is complete. The standards have been approved and incorporated into the contract between DOE and Bechtel Nevada. Bechtel is currently working on implementation of the new standards. As a first step Bechtel is examining the range of safety management related plans that were previously developed in response to individual safety initiatives. Bechtel's goal is to have a single management plan for all site work. It is expected that agreement on such a plan will result in more efficient operational and safety management and better use of resources. Bechtel views the agreements between DOE and Bechtel on the work, hazards and standards developed through Work Smart as the basis for deciding if any new initiatives would offer benefits to safety

management programs. Bechtel is also examining improvements that will result from the new standards. They have identified an estimated savings of about $250,000 per year for onsite shipping of radioactive materials achieved through paper-work reduction.

Principal benefits identified include:

- The teaming that occurred between DOE and Bechtel has forged a new approach to problem solving and work planning that is continuing and is expected to be long lasting. One of the team members of some 30 years experience in the DOE complex stated that the *Work Smart* application was the first time in his experience that he had ever seen DOE and the contractor work together on a project.

- The teaming of individuals from all aspects of NTS activities created a previously non-existent appreciation by managers and workers for the full scope of work at NTS and a mutual respect for work outside the endeavors of individual team members.

- Inclusion of individuals from private industry and from within DOE but external to NTS provided valuable insight into how NTS practices compared to practices in the rest of the world. In some cases teams discovered that NTS practices had fallen behind current best practices; in other cases NTS practices were found to be exemplary.

- In many instances, the *Work Smart* experience at NTS has altered the way people think about doing work. There is a growing tendency for people to think seriously about their work and why it is being done in a particular way. Prior to the *Work Smart* experience, the prevailing approach to work was to refer directly to a DOE Order and follow any instructions in the Order.

- During the *Work Smart* team evaluations many instances were identified where work practices were more stringent than those found in similar commercial work without any apparent added benefit. One example is the precision levels required for surveying. The precision requirements were considerably more stringent than required for normal construction and more so than required by the State of Nevada. Other such examples are documented in volume 3 section 5 of the NTS *Work Smart* documentation.

CHICAGO

The Fermi National Accelerator Laboratory (Fermilab) in Illinois applied *Work Smart* for all activities at the site, achieving major reductions in documentation requirements and a savings of 17 person years by involving workers in a thorough re-examination of the work and hazards. Fermi has had a Work Smart Set of Standards in its contract for over two years. Two significant observations have become apparent as a result of developing the Work Smart Standards. The first is that Laboratory line management and workers, as well as the DOE Area Office, have taken ownership of the standards and their implementation as was not the case when standards were "sent down from above". Management ownership of the standards has facilitated integrating environment, safety and health into laboratory operations. The second observation is that implementation has been found to be relatively easy. The laboratory attributes the shift to line management ownership and the ease of implementation to the improved working relationship and mutual understanding and agreement between DOE and the laboratory about the work, the hazards and the standards and to the collective understanding of why the standards are important.

- An annual reduction from 30,000 pages to 3,000 pages in the documentation required to satisfy National Environmental Protection Act (NEPA) Reviews at the Fermilab in Illinois.

- A reduction in cycle time for preparation of the FermiLab Environmental, Safety, and Health Management Action Plan (ESHMAP) from 1400 person hours to 300 person hours.

- Review and approval cycle for FermiLab Accelerator Safety Documentation reduced from 1.5 years to 2 months.

- Elimination of the need for an estimated 27 person years of effort answering compliance questions about standards that were found not to apply to the actual work and hazards existing at FermiLab

- Review and approval cycle for FermiLab Accelerated Safety Documentation reduced from 1.5 years to 2 months Cycle time for approval of FermiLab

environmental overflights reduced form one year to one day. Reduction in size of the FermiLab Fire Protection Program document from 300 to 30 pages

- Reduction of almost seven FTEs (full time equivalents) assigned to environment, safety, and health compliance at FermiLab as the line organizations assumed more active responsibility for FermiLab's Work Smart Standards

- An important result of the WSS process for Fermilab is the elimination of overlapping and conflicting requirements. For example, under the old requirements there were three sets of overlapping and conflicting standards for underground tunneling. Any one of the standards would have been adequate. To implement all three was a nightmare. Now there is one set of standards.

Ames Laboratory

Ames is located on the campus of Iowa State University and many Ames researchers hold joint appointments with the Lab and the University and perform research for both DOE and the University. Prior to developing a Work Smart Set of Standards, the standards used for University work and for DOE work were different, even when DOE and University research were conducted in the same lab. Using two different sets of standards in the same laboratory area was confusing as well as cumbersome.

The standards agreed to in the Work Smart Standards set are now predominately the same for DOE and University work. The expected result is improved efficiency in performing work safely and a more cost effective use of personnel and resources. In using the Work Smart approach, researchers worked along with ES&H professionals in tailoring the Work Smart Standards to the work. This experience laid the ground work to continue this multi-disciplinary teaming approach to implementing ISM. Ames has recently completed an assessment of their programs using the ISM principles and the assessment was performed using teams involving many of the same people who applied the Work Smart Process. The Ames team will be responsible for revising and improving programs to fully implement ISM. The laboratory reports that the Work Smart approach to teaming developed relationships among researchers and safety professionals that is essential to achieving real buy-in of the ISM program.

Brookhaven National Laboratory

In response to the Integrated Safety Management Evaluation, BNL plans to conduct the Work Smart Standards process. Preliminary planning has begun, and the process will begin by November 1997 or sooner. The Work Smart application is viewed by Energy Research as essential to establish a foundation of technical agreements and working relationships necessary to initiate an effective ISM program.

FOSSIL ENERGY

Fossil Energy Technical Center

With the consolidation of the two FETC facilities, the Work Smart process was expanded to include both facilities with the intent being to develop one FETC set of standards/requirements. The work and its hazards have been analyzed and both facilities are in the process of identifying the Work Smart Standards. Confirmation is expected in late fall of 1997.

RICHLAND

Lessons learned from the REDOX facility Pilot application were incorporated into a path forward to identify surveillance and maintenance standards for the PUREX facility based on a comprehensive and thorough hazards analysis of the facility. The Work Smart Standards set is ready for signature by the site manager and modifications to the contracts are being prepared. The facility is being transferred from the Hanford Management and Integrating contractor that performed the deactivation work (Fluor Daniel) to the Environmental Restoration contractor (Bechtel) that will perform the surveillance and maintenance activities. A new Work Smart application for the 310 Treated Effluent Disposal Facility has also recently been completed for Waste Management Services of Hanford, Inc.

Principle benefits of applying Work Smart at REDOX includes a 90% reduction in risk to workers and cost avoidance of $16 million over twenty years.

- Evidence of organizational learning through Work Smart applications became apparent as the Purex Work Smart application began. At the first Identification Team Meeting the team members at Purex had questions related to the work

and the hazards - not to the requirements. During the briefing on how the work was to be done the team challenged the frequency of entry into the building - why quarterly and not once a year or only twice? The nature of their questions suggested that there has been a rapid transfer of organizational knowledge based on lessons learned from the REDOX Pilot (i.e., focus first on redesigning the work to eliminate hazards or minimize exposures). Prior to instituting the *Work Smart* approach such discussions focused on requirements and a need to justify why all DOE orders and similar requirements did not apply. A number of other benefits emerged from the Purex Work Smart application.

- Discovery of New Information. In conducting the *Work Smart* process, it was discovered that high level radioactive waste and Transuranic (TRU) waste were added to the PUREX tunnels as recently as the summer of 1996. These facts will require a DOE / EM-40 decision on how to deal with the high level waste in the tunnels and also avoids the expense of a possible unresolved safety questions (USQ). Just getting this information in front of people was a big accomplishment, since it had been missed up to this point in the project.

- Improved Communications and Reduced Duplication of Efforts. Communication among the various entities that will work at the PUREX facility has been improved and duplication of efforts has been reduced. For example, the first meeting of the Convened Group, in reviewing Bechtel Hanford's proposed outline for S&M Authorization Basis, it was discovered that another contractor already had a Interim Safety Basis (ISB) covering the same basic information. Recognition of this situation led to meetings in which the two contractors decided to work together and use the work that had already been accomplished as part of the Authorization Basis for PUREX S&M.

- Ease of Implementation. The facilities S&M Task Lead commented that he liked the level of detail provided in the REDOX and PUREX *Work Smart* reports because they could be used directly in preparing implementing procedures. Other documents identifying regulatory requirements tended to only list the requirements citation (i.e. 10 CFR 1910). This type of requirements citation can not easily be implemented because another expert must be brought in to determine the specific requirements with the cited CFR that need to be incorporated into the implementing instructions.

- Reduced Order Compliance. Many potentially applicable DOE Orders were not included in the list of standards identified by the *Work Smart* Process. The exact number of orders that might have been required is difficult to determine

but a quick comparison of orders previously identified in the PUREX Standards/Requirement Identification Document showed 31 DOE orders and standards as applicable to S&M as compared to 7 identified by the *Work Smart* process. Although difficult to quantify, the magnitude of this difference indicates that significant funds were saved by not having to comply with these orders/standards that provided no additional ES&H protection or by not having to go through the usual DOE exemption process.

ROCKY FLATS

The Rocky Flats use of the Work Smart Standards process focused on two specific applications; both involved confirmation and approval of authorization basis documents for Buildings 440 and 771. The hazards analysis and the Work Smart Standards for work in these buildings were confirmed using the Work Smart Standards Process. The standards/controls were incorporated in the Basis for Operations (BFOs) that were confirmed and approved by the agreement parties. The BFO is a tailored safety basis (authorization basis) document. Operations in Building 440 (waste storage) are underway using these controls. Material consolidation and removal operations in Building 771 are expected to be under the BFO in December 1997. Rocky Flats now has in place Authorization Agreements for Buildings 771 and 440 and a site-wide Authorization Agreement.

OHIO

Mound: An application of Work Smart Standards has been initiated to develop an accelerated method for decontamination and decommissioning of the surplus CFX facility.

SAVANNAH RIVER

Work Smart Standards have been completed and signed into contract for all environmental restoration work at SRS and for all work at the TNX facility. The

Savannah River Ecology Center has completed a Work Smart Standards set that has been approved by DOE and the University of Georgia and is being incorporated into contract.

Work Smart design and documentation standards for the F- and H-Area Groundwater Remediation Project at the Savannah River Site in South Carolina achieved a savings of $2.8 million with no reduction in environmental protection through involvement of the state environmental agency in the *Work Smart* Process.